

Vulcan Plays

Major Role In Economy

Because it is far from the city's core area, Vulcan's large chemicals Division Plant often is forgotten when Wichitans talk about their major industries.

With 653 employees, whose average educational level may be the highest at any major firm in Wichita, and a payroll of more than \$11-million a year, Vulcan plays an important role in the area's economic and civic well-being.

Not only do the men and women of the Chemicals Division take an active part in Wichita's cultural and civic affairs, they contribute greatly to the general economy. In 1978 it is estimated Vulcan employees paid into the local economy the following amounts of money:

• For food	\$2,225,000
• For housing	3,520,000
• For clothing	870,000
• For medical expenses	720,000
• For transportation	2,400,000
• Personal care & education	1,270,000

Its \$84-million in sales places the Wichita chemicals complex of Vulcan in the forefront among local manufacturers.

Its greatest impact on the people of the area — one which is felt by every householder and every operator of a business — may come from the plant's use of power from K.G. & E., the Electric Company.

Located near K.G. & E.'s Murray Gill generating facility southwest of Wichita, Vulcan operates at a relatively constant power demand that enables K.G. & E. to reduce its operating costs to its other customers.

Thus Vulcan's \$19-million expenditure for utilities in 1978—most of it electrical power—would have resulted in increases of 17 per cent in the average householder's electrical bills in 1978 if Vulcan had not been on the line. Vulcan contributes about 6 per cent of K.G.&E.'s total revenue.

The production of industrial chemicals is an expensive process. The cost is increased by the need to produce them in an environmentally acceptable manner. In 1978, Vulcan made capital

expenditures of \$9.8-million at its Wichita plant, with \$3.9-million for environmental protection alone. The Wichita Chemicals Division Plant also put an additional \$9.7-million into the economy for goods and services in 1978.

When one considers multiplier effects, Wichita's neighbor to the southwest truly contributes greatly to the general welfare of the community.

Wichita Engineering Staff Serves All Chemical Plants

The Chemicals Division Engineering Group, while headquartered at the Wichita complex, serves the entire division.

These staff experts get involved in everything from "small potatoes" projects to building the largest additions, like the \$60-million Chlor-Alkali plant completed at Vulcan's Geismar, La., complex in 1976.

The staff includes 13 engineers with various degrees in both general and specialized technical areas.

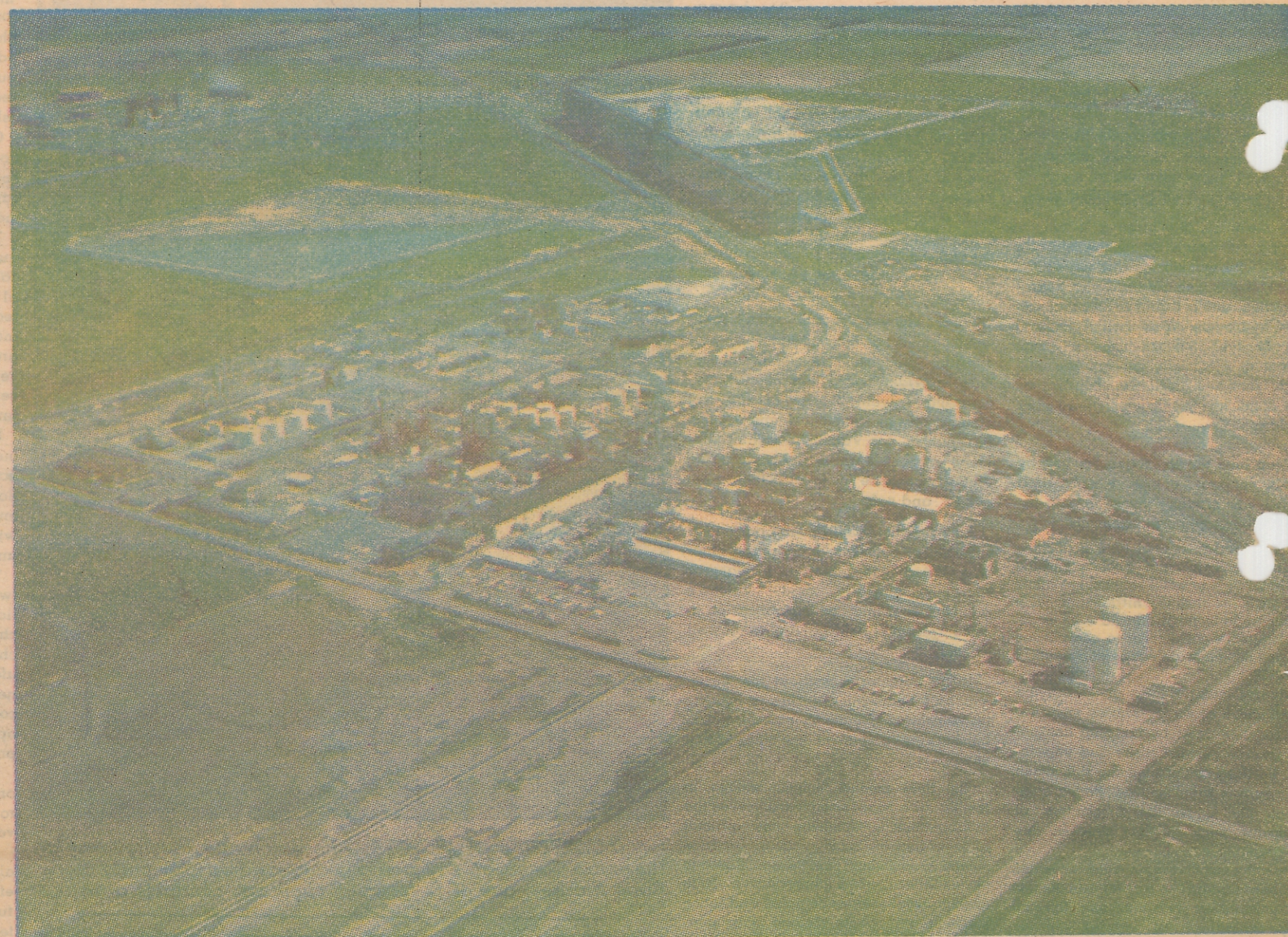
The division engineers usually work on a team basis with the individual plant's engineering staff members. They follow projects from design through the construction phase to the start-up and shake-down of a new

plant. While Vulcan acts as its own general contractor on most projects, excellent engineering firms (such as Litwin Corp. in Wichita) are used to provide detailed design engineering and to procure materials for the job.

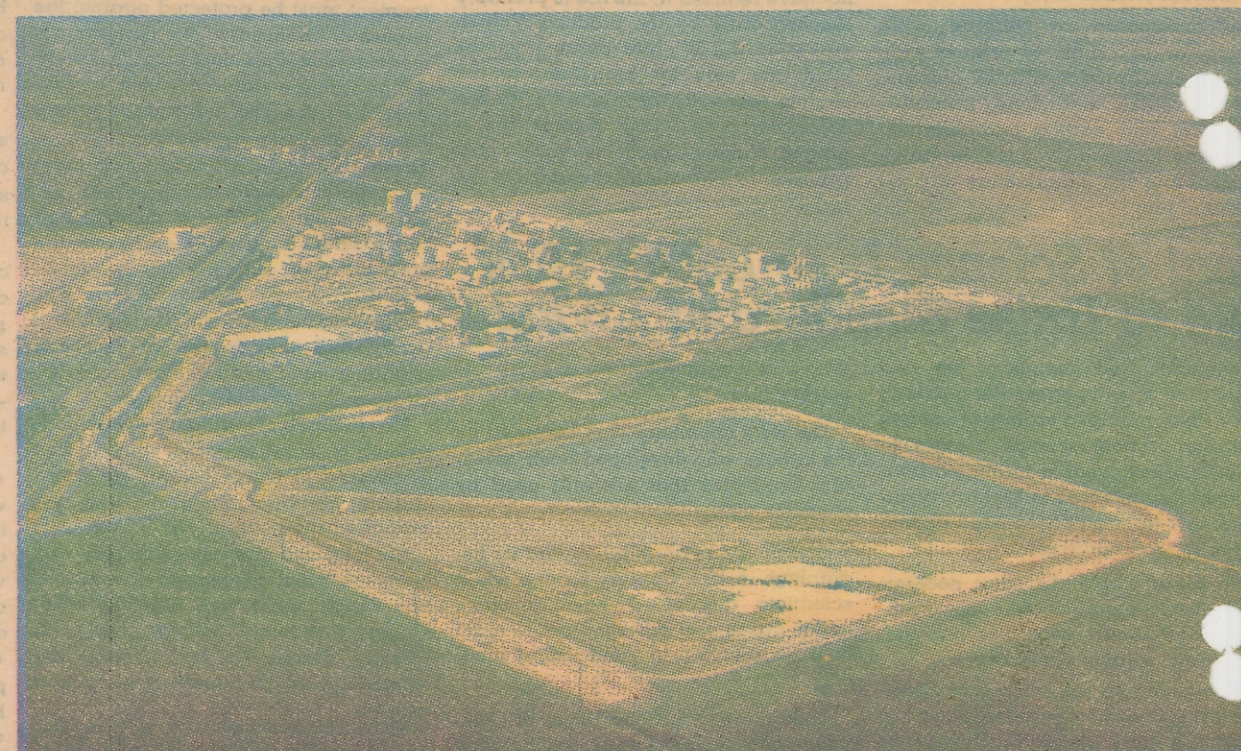
The Division Engineering Group was responsible for the construction of the Chloromethanes II plant, the wastewater management system, and the Quality Control Laboratory Building. Its latest project is the construction of an \$18-million methyl chloroform plant at the Geismar, La., complex.

The Chemicals Division has a capital expenditure goal in the \$300-500 million range for the five-year period 1978-1982. That means these engineers will have much to do far into the coming years.

Vulcan's Wichita Complex



Aerial view shows expanse and neatness of Vulcan's Wichita plant.



Huge lagoons can impound 50-million gallons of water.

Vulcan and Wichita: A New Era

STORY ON PAGE 3



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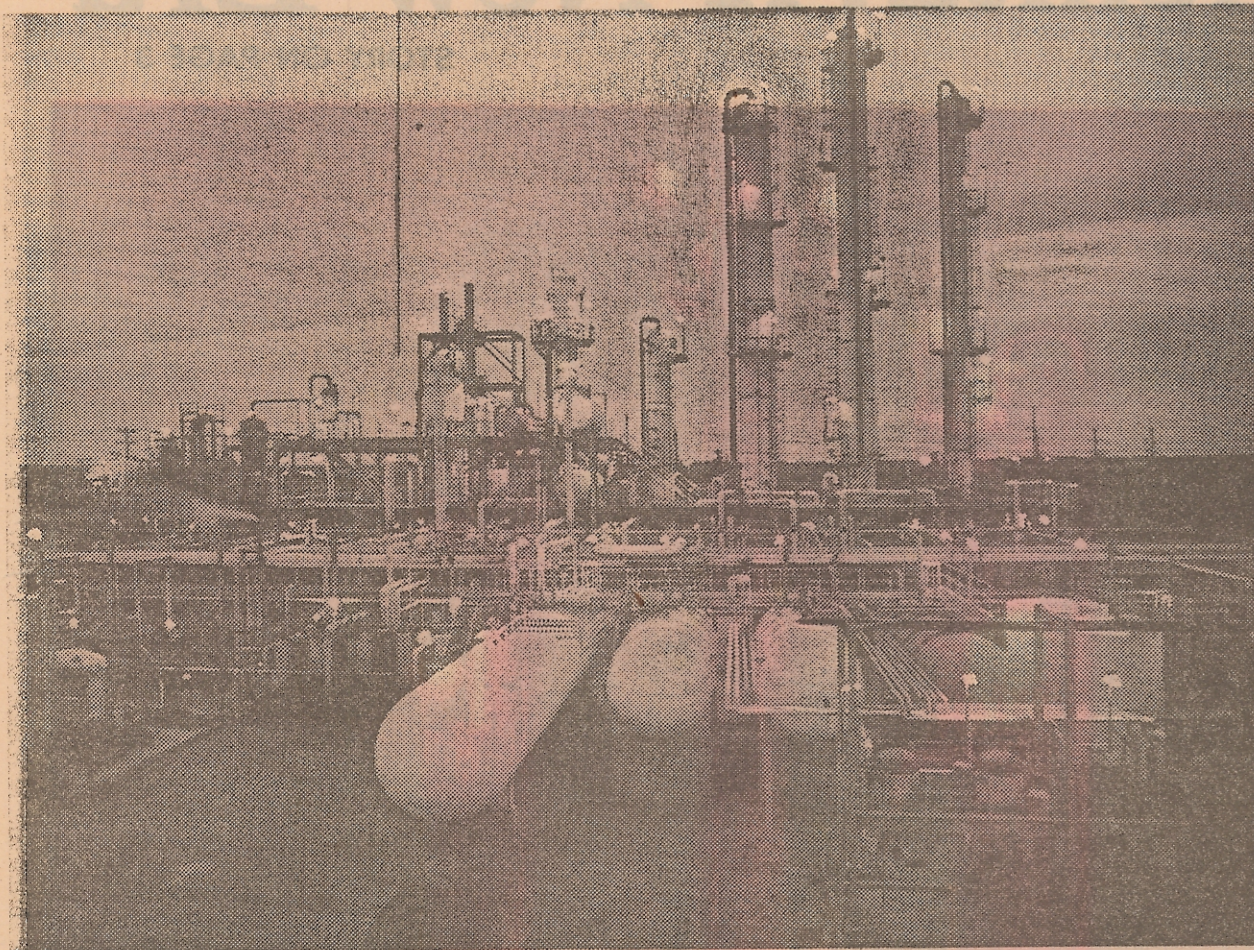


Superfund

"Advertising Supplement to the Wichita Eagle and Beacon"

AN ADVERTISING SUPPLEMENT TO THE SUNDAY WICHITA EAGLE & BEACON APRIL 29, 1979

\$12-Million Chloromethanes Plant 'Monument to Research'



VULCAN'S NEWEST FACILITY — The Chloromethanes II facility in Wichita is Vulcan's newest. The \$12-million plant, which incorporates into its design the latest environmental protection facilities, employs some of the world's most advanced chemical technology. The technology was developed by Vulcan's own research group which is based in Wichita.

Quality Control

During September of 1978, the Quality Control Department at Vulcan moved to spacious new quarters in a modernistic \$930,000 laboratory building.

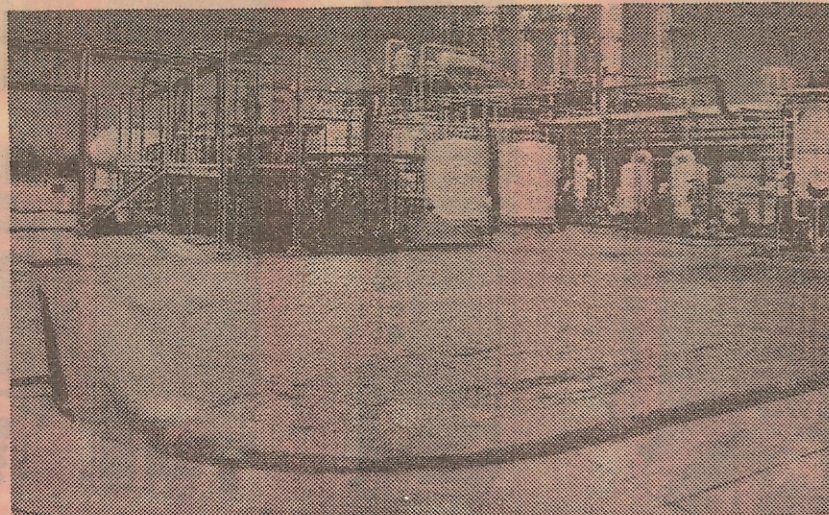
The tan concrete building — 12,400 square feet complete with skylights and a courtyard — has three large labs to house the 28 chemists and technicians who provide 24-hour-a-day service for the plant's manufacturing and sales efforts.

The personnel and laboratories are organized by function: one group provides service to those plants producing organic chemicals, another provides service to the inorganic chemicals plants and the projects lab performs special, non-routine analyses.

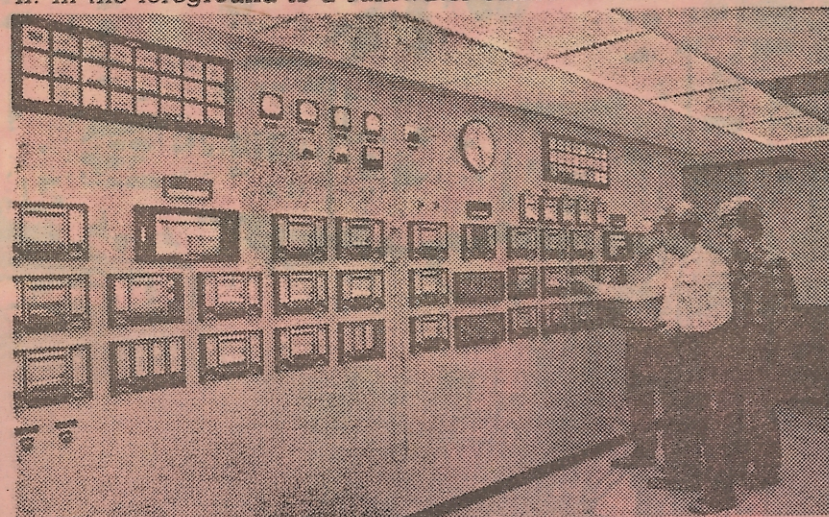
The labs were designed with both efficiency and safety in mind. All waste materials generated by the control lab go to the waste management system for disposal.

The control lab uses a wide range of analytical techniques to assure quality products. In addition to time-tested methods, such as acid-base titrations, the labs use many innovative procedures involving electronic instruments. The inventory this sophisticated equipment includes is: an automatic colorimetric analyzer, two infrared spectrophotometers, an atomic absorption spectrophotometer, and 25 gas chromatographs. The total amount invested in this equipment exceeds \$250,000.

Approximately 250 samples are processed each day, with each sample being analyzed for an average of 5 to 10 components. Samples are routinely analyzed to a precision of one part per million; but, the equipment is able to detect certain metals and organic chemicals at concentrations as low as one part per billion.



CONTROLS DESIGNED-IN — Environmental protection devices were built into the design of Vulcan's new Chloromethanes Plant II. In the foreground is a rainwater control trench.



CONTROL ROOM — Chloromethanes II ultra-modern control room from which the chemical processes are continuously monitored with electronic instrumentation.

In the early 1950's, a decision was made for a small but growing chemical company to concentrate its efforts in the manufacturing of chlorinated solvents and to become a major market power in the field.

Today, with its three distillation columns soaring 125 feet above the surrounding farmland, Vulcan's new \$12-million Chloromethanes II plant is a monument to the 25 years of research, development and refinements necessary to reach that lofty goal.

In those early days, the technology to produce chlorinated hydrocarbons was very closely held by a few producers. In order to "get into the game," Vulcan had to develop its own production processes.

In 1956, after 3 years of research, the Chloromethanes I plant began operation. The original plant, updated and expanded, is still producing efficiently today. In fact, the manufacturing processes Vulcan scientists have developed for chlorinated solvents are among the best in the world and consistently produce high-quality products at competitive costs.

The new Chloromethanes II plant was brought on-stream in November 1977. At maximum rates it can produce up to 274 tons per day of methylene chloride, chloroform, and carbon tetrachloride. In order to meet changing customer demands, the production amounts and mix of the three solvents can be varied widely.

Methylene chloride is used principally in paint and varnish removers, but is finding increasing use in aerosol propellants, as a cleaning agent for metal and plastic parts and electric motors, and in the pharmaceuticals and food processing industries. For example, Vulcan methylene chloride is used by General Electric in the manufacture of Lexan plastic and by Eli Lilly to make pharmaceuticals.

Chloroform, once but no longer used as an anesthetic, now serves as the raw material for teflon coatings and other plastics and resins. Its other major use is as an intermediate in the preparation of fluorocarbon refrigerants. Two of the larger customers of the Wichita plant are Racal, Inc. and Dupont.

Carbon tetrachloride is used primarily in refrigerants and grain fumigants. Farmland Industries, Thompson Hayward, McKesson, and Racal are among Vulcan's many buyers of "carbon tet."

The modern chloromethanes process uses up to 270 tons/day of chlorine and 25,000 gallons of methanol (wood alcohol) for raw materials feedstocks, and has two distinct and separate reaction and purification systems. The main reaction takes place at a temperature in excess of 700°F in a corrosion resistant reactor vessel.

The product recovery and purification systems consist of a series of pumps, compressors, scrubbing towers, distillation columns, tanks, and heat exchangers. The plant circulates over 12,000 gallons of water per minute to cool down the product and equipment and to condense refrigerant in the huge refrigerant rated system alone has the equivalent capacity needed to air-condition 400-450 homes.

As is the case with most chemical plants and refineries, Chloromethanes II is operated round-the-clock every day of the year. The control room contains a dazzling array of electronic instrumen-

tation which allow a total of only 3 operators to monitor and control the entire process. Included in this are five continuous on-stream analyzers which automatically monitor product quality and composition and check process flows, levels, temperatures, and pressures. This allows the operators to make immediate minute adjustments, and thereby provide assurance of quality products.

Environmental control equipment and waste-management facilities for the new plant were designed by Vulcan to surpass the current body of national and state regulations.

Two separate sewer systems were built to segregate storm-water run-off and process-wastewater. This involved grading the various plant areas for proper drainage direction as well as making liberal use of special paving materials, concrete curbing, trenches, holding sumps, and electric pumps.

In addition to these two separate handling and treatment systems, two lined lagoons rated at 180,000 gallon capacity, were built to hold any surge from overflow of either system.

All areas where possibility for chemical spillage exists have been paved to prevent chemicals from leaching into the earth. Special consideration was given to the acid area of the plant. A containment area was built using 23,000 special acid-resistant bricks at \$3.16 per brick — \$73,000 worth of bricks alone.

Among the many tanks in the plant are three half-million gallon vessels used for storing finished products, and a quarter-million-gallon vessel used for holding methanol feedstock. In order to protect against the slim chance that one or all of the tanks might suffer a failure, a concrete dike was built around all four tanks. The area inside the dike is large enough to contain any spill, large or small. A gridlike leak monitoring system was built under each tank base to detect any seepage which could not be detected by periodic visual inspection.

The final environment protection control consideration in the Chloromethanes II plant was to have 65 relief valves placed strategically in the processing equipment. These relief valves are intended to prevent any unexpected overpowering of the equipment which might lead to an uncontrolled release of product to the environment.

For that sidewalk superintendent in every one of us, some of the construction statistics of the Chloromethanes II plant might be interesting. The plant has 11 miles of piping, 75 pumps, 220 tons of structural steel, and 4700 connections in its 36 miles of electrical wiring. One of the most important statistics to Vulcan and the various construction contractors involves the safety record of the project. During the entire 120,000 direct manhours expended to erect the plant, the only lost-time injury accident suffered was a broken finger.

Products Made Here

The raw materials Vulcan uses to produce its wide range of Industrial Chemicals are in abundant, but not inexhaustible, supply. The are: salt, natural gas, water various hydrocarbon waste compounds from petroleum processing, phenol, wood alcohol and methanol.

These materials are mined hydraulically from vast underground beds that were deposited millions of years ago when much of Kansas was covered by shallow seas.

The salt, in the form of brine, is pumped to the plant where the addition of electricity transforms and separates the salt water into chlorine and hydrogen gases, and a liquid solution of sodium hydroxide (also called caustic soda or lye). Vulcan uses a large amount of electricity in this process, which forms a reliable, continuous base load for the power generating company.

Vulcan sells the hydrogen for use by another chemical company or burns it in boilers to produce steam for use in its chemical manufacturing.

Sodium Chlorine is sold as a liquid for disinfecting municipal water supplies; but, most of it is used to produce other chemicals at the Wichita Plant. The caustic soda is purified and sold in either liquid or solid form to companies that use it for a wide range of everyday products.

Vulcan's caustic soda goes into the manufacture of soap, textiles and aluminum. It is used by canning companies to peel certain fruits and vegetables. Bottling companies use it to wash and sanitize their bottles. Paper companies use it in the production of newsprint, such as that used in this newspaper.

The chlorine that is not sold for water treatment undergoes further processing by combination with methane, the primary constituent of natural gas or various waste products from petroleum processing, or phenol, or wood alcohol. None of the chemicals produced with the chlorine is available directly to the consumer, but all make a significant contribution to the high standard of living that Americans enjoy.

The combination of chlorine with methane or, in a different process with wood alcohol, produces three chlorinated solvents: methylene chloride, chloroform and carbon tetrachloride. Methylene chloride is used in paint strippers and the manufacture of photographic film.

Goal of Science Is to Lower Risk And to Raise Standard of Living

Chemicals and chemistry are two words that have boggled the minds of many. They prompt a variety of images from high school science classes to seemingly unsolvable formulas, from poisonous substances to laboratory animals, and from proposed bans of pesticides to food additives.

Yet all of mankind's basic necessities — food, clothing, transportation, shelter and health — would be impossible today, without chemistry.

Chemicals and the science of chemistry have become an integral part of everyone's daily life; so much so, that they are taken for granted.

It was chemistry in ancient Egypt that was responsible for the development of metallurgy, fabric dyeing, leather tan-

ning and the manufacture of glass and pottery.

Although chloroform is rarely used anymore as a general anesthetic, it still finds wide application in the pharmaceutical industry. It is also a raw material in the production of refrigerant gases, commonly called Freons, used in home air conditioners. An identical product is manufactured locally under the trade name Racon. Carbon tetrachloride also is used to make refrigerants for automobile and air conditioners. Furthermore, carbon tetrachloride forms the basis for grain fumigants used by elevators throughout this area to protect stored grain from infestation by insects and vermin.

When chlorine reacts with some waste products from petroleum processing, the result is perchloroethylene, a widely used commercial dry-cleaning solvent. Many of the dry cleaning shops in Wichita, and around the country, use Vulcan's Perchloroethylene, marketed under the trade name PerSec, because it is effective, low-priced, and safe.

A by-product from the manufacture of chlorinated solvents is hydrogen chloride. When it is dissolved in water it becomes muriatic acid. Vulcan's muriatic acid finds wide application in metal treating (pickling) and in oil well drilling.

In its pure form, without the water, Vulcan's hydrogen chloride is used to make printed circuits for electronic calculators or to remove lint from cotton seeds.

The final product Vulcan makes in the Wichita Plant complex involves the combination of chlorine with phenol (also called carboic acid) to produce pentachlorophenol, or "Penta." Penta is an excellent wood preservative. It is used to treat telephone poles and fence posts. Fence posts treated with pentachlorophenol are sometimes called "Penta Posts" by local lumber yards. Vulcan supplies about 40% of the Penta used in U. S. for wood treatment. All of it is made in Wichita.

Although the average person may not have realized it, his life is probably touched daily by the products Vulcan makes in the Wichita plant: from the toast one eats for breakfast, to the clothes taken to the cleaners, to the calculator with which income tax is figured, Vulcan's products make a contribution to the nation's standard of living.

The word chemistry was invented by the Greeks who developed basic scientific principles that are still used by chemists today.

Chemistry as an industry had its beginnings in 19th Century Europe when scientists discovered how to make acids, gases and other materials react in ways that would yield useful products.

Today the U.S. Department of Commerce lists products under 11,500 separate categories ranging from abrasives to zippers. Few of those could be manufactured, packaged or distributed without the help of chemistry.

R & D Centered in Wichita



R & D CENTERED IN WICHITA — Research and development for the entire Chemicals Division is headquartered in Wichita. Here, Ernie Nickens, one of 12 research chemists, conducts a test.

The chemical industry is an important agent in the process of social change, and thus has the responsibility to manufacture needed existing products while investing heavily in research to develop future products.

At the same time, man and his environment must be protected against the misuse of chemicals. The benefits are measurable; thus they provide a well-defined gauge against which to calibrate the risks. The risk and the benefit must be considered together.

Some chemicals do pose risks; many are highly poisonous, others can explode violently; some, if misused, can cause illness or death. In each case, the probability of danger must be determined.

The balance between the degree of safety and the degree of risk can change in time, suddenly or gradually, as scientific knowledge grows.

For example, Thalidomide was considered a "safe" sedative until it was discovered to cause serious defect in unborn children. Then the risk outweighed the benefit.

Not long ago, the risk of surgery was often too great to consider no matter how serious the illness. Now the risk of surgery — while still present — has been greatly diminished by science and chemistry; so, the benefit is much more certain.

Many scientists prefer the term "acceptable risk" rather than "risk." This means that a certain degree of risk is permitted because the probability of harm is low or there is no alternative to fulfill the needs.

For example, they would say, it is an acceptable risk to use a toxic chemical substance, provided it is safely and properly handled and controlled. It is not an acceptable risk to use chemical substances for just any purpose. Gasoline works well in automobile engines, but its dangers as a cleaning fluid are documented in hospital emergency room files. Thus, there are acceptable risks for toxic substances.

A qualifying factor for a toxic substance is quantity. Table salt, for example, is usually considered a safe substance. But, consumed excessively it can have damaging health effects.

In modern chemistry, the words become highly technical and the effects of chemicals are subtle. But the same principle of risk-versus-benefit — measuring the degree of hazard that a substance possesses against its good effect — applies, no matter how complicated the chemistry gets.

Testing and regulating chemical substances is far from an easy job. Environmental legislation drafted less than a decade ago includes concepts already made obsolescent by rapid advances in analytical technology. When these laws were passed, the analyst could detect trace compounds at a level of around one part per million (one part per million is equivalent to three hundredths of an ounce of salt in a ton of potato chips). Smaller quantities were regarded as not existent, or "zero."

Today, science's ability to measure trace quantities has been extended into the parts-per-billion and parts-per-trillion range. (One part per trillion is the equivalent of a six-inch step on a journey to the sun). More and more chemical compounds are being detected in almost infinitesimal amounts in our foods, water, and air. In today's technology "zero" is a rapidly diminishing concept.

One of Vulcan's many local construction projects will nearly double the floor space of the 20,000 square-foot Chemicals Division Research and Development Center by early 1980.

The present facility, which is headquarters for R & D for all Vulcan chemicals operations includes offices, several sophisticated laboratories, a technical library, a large pilot plant, a maintenance shop, chemical storage areas and a glass-blowing shop. The center also houses Vulcan's technical service labs, where customer problems and inquiries are handled.

From the handful of experts working out of a single lab in 1959, the group has grown to 49 members, including a dozen chemists and several chemical engineers. The staff is well pedigreed, with nine Ph.D's, two masters degrees, and twenty-one bachelor's degrees.

The department is broadly divided in two groups: a chemistry research section, which does research on new chemicals, finds new uses for existing chemicals, and improves ways to manufacture current products; and an engineering development section which is concerned with designing and developing processes for new plants and improving existing plants.

Four R & D employees work full-time on environmental concerns, in addition to the environmental control work involved as part of many projects.

The environmental group supports all three plants in the division in their efforts to comply with all existing and future regulations at the local, state and federal levels. They also stay abreast of new environmental control techniques as they are developed in the industry, and play a major part in forming the division's plans and policies to meet the environmental needs of tomorrow.

A typical R & D project begins in one of the labs, where experimental work is done in glassware, together with a scientific computer system and modern electronic analyzers. Further experiments are then conducted in the pilot plant, using scaled-down process equipment. Based on pilot plant experience, a commercial plant can be designed, constructed, and operated. The time span from glassware to a functioning plant ranges from two to five years.

The Division's Licensing Group works very closely with Research and Development. When a process design has proven effective, the Licensing Group assists foreign companies that are interested in using such technology. Vulcan processes are currently producing solvents in plants located in Peru, India and Taiwan. Two additional plants are under construction in Mexico and Poland, and a third plant has been licensed in Japan.

Vulcan supplies the licensee with the right to use its patents and expertise. A process book for a new plant provides basic designs and equipment specifications. Operating, safety and analytical manuals are also written. The Licensing Group consults with the licensee during design, construction, and start-up of the plant. They will even arrange to train the new operators.

Vulcan Began Small, Employs 6,000 Persons over Nation

Vulcan is a multi-industry company organized by product line and geography into eight independent divisions. The five domestic divisions in the Construction Materials Group operate 104 facilities in 12 states and, as a group, make Vulcan the nation's leading producer of construction aggregates.

The sixth division in this group is located in the Easter Province of Saudi Arabia and provides construction materials for that country's massive modernization and industrialization projects.

The Metals Division represents a major force in the growing trend towards recycling. It is one of the largest producers of secondary aluminum in the United States, as well as being one of the country's two leading manufacturers of detinned steel and inorganic tin chemicals. It has seven production plants spread between Corona, Cal., and Baltimore, Md.

The Chemicals Division, the one most familiar to Wichitans, is a leading chemicals manufacturer producing a diversified line of chlorinated hydrocarbons, industrial and agricultural chemicals. It has the distinction of being the world's second largest producer of the chlorinated solvents it manufactures. In addition to the Wichita complex, the division has two other plants — in Texas and Louisiana — and 23 distribution terminals to serve customers all around the nation.

Vulcan, like most other major corporations, did not spring into Fortune magazine's list of the top 500 U.S. cor-

porations overnight. Its roots can be traced back through mergers and acquisitions to several companies with colorful histories dating to the early years of this century.

The predominant force in the organizational efforts came from the Birmingham Slag Company, dating back to 1910, and the members of the Ireland family who owned it.

Birmingham Slag began by selling the waste product from the area's iron and steel-making furnaces, slag, as an aggregate to build highways in the rapidly growing South.

From this small start in the Alabama boomtown which still serves as home for the corporate headquarters, the Irelands and their associates built up their crushed-stone business into the early 1950's and then began to diversify their interests.

In 1956, Birmingham Slag acquired a publicly-held corporation, the Vulcan Detinning Company (began in 1902) and took Vulcan Materials Company as its new name. The following year saw Union Chemicals and Materials Corporation and eight other aggregates companies merge into Vulcan. The next 22 years were punctuated by further outside acquisitions and bursts of internal growth, such as the Geismar, La., chemicals complex begun in 1967.

Today Vulcan is the largest corporation headquartered in the State of Alabama. With a work force of 6,000 men and women, Vulcan's 1978 sales of \$652-million rank it with the top 400 public corporations in America.

Began As Frontier

Vulcan Wichita Facility Has 29-Year History

Ten miles outside the core area of Wichita and spreading across the open prairie are the huge, circular storage tanks and refinery-type towers of Vulcan Materials Company chemical division.

The chemical facilities have had a 29-year history in Wichita. Association with Vulcan began in 1957. Prior to that time the chemical plant was part of the Frontier Chemical Company.

Frontier began in 1946 when three partners built a small plant at Denver City, Texas, in the oil fields where extensive salt, gas and oil deposits existed.

The original purpose of the company was to manufacture muriatic acid, for the oil fields, and caustic soda, primarily for gasoline plant and refinery installations.

Frontier's entry into caustic soda-chlorine manufacture marked the only entry of an independent in the alkali industry in the United States in 25 years.

At the end of three years, the Denver City plant had tripled its original size. It consistently produced its capacity of 34 tons a day of caustic soda and chlorine, 113 tons a day of muriatic acid, primarily for the oil industry.

In 1950, the company was sold to the Murchison interests of Dallas, and shortly thereafter construction began on a 40-ton-per-day caustic-chlorine plant in Wichita. That plant occupied 12 acres and was built for approximately \$3-million.

In the first stage of production at the plant elemental chlorine and caustic soda solutions are formed simultaneously by electrolysis of salt brine.

The only raw material required for this production is salt, which is obtained in the form of brine from wells located on a five-acre tract approximately 13 miles from the plant. Electric power and gas (which could be considered as raw materials) are available through contracts with local utility companies.

Its Wichita location enabled Frontier to reach the perimeter of the large chemical markets to the East, and at the same time become ideally situated to serve the growing industrial markets of the West.

Reaching both sectors of the country was possible because the Frontier organization, through affiliated companies, owned and operated its own fleet of tank cars and tank trucks for delivery of their products.

By 1953, production at the caustic-chlorine plant expanded to 60 tons per day, principally for the oil and paper industries, bleach and soap manufacturers, and water purification plants. That plant has since been expanded to a capacity in excess of 500 tons per day.

Also in 1953, a benzene hexachloride (BHC) plant was acquired in Wichita, at one time one of the largest BHC producing units in the U.S. The plant was closed down when BHC ceased to be an active ingredient in dusts and sprays used in bollweevil control.

In December of 1954, Frontier merged with an aggregate company and became a division of Union Chemical and Materials Corporation. It also became a publicly-held company listed on the New York Stock Exchange.

Construction began in May, 1955 on a \$6.5 million expansion — a new chloromethanes plant which would produce methylene chloride used in paint remover, chloroform used in the production of pharmaceuticals, and carbon tetrachloride used in refrigerants and insecticides formulations.

In December of 1957, the Murchisons sold their interest in Union Chemical to Vulcan Materials Company of Birmingham, Ala.

After the sale to Vulcan additional expansion began:

A plant was constructed for the production of pentachlorophenol, a commercial wood preservative, in December 1957.

A perchloroethylene plant was bought on stream in September, 1958. From this plant the Frontier division produces custom-grade perchloroethylene for fine dry cleaning — under the trademark name "Per Sec" — as well as carbon tetrachloride.

Mid-1958 also saw the formation of a research and development department and the building of new headquarters.

In November of 1961 the Kolker Chemical Corporation of Newark was acquired, providing Frontier with a chemical plant in the eastern half of the U.S., enabling it to broaden its marketing activities in that area.

Eventually the Newark plant was replaced by a more modern and more diversified and larger production facility at Geismar, La., on the Mississippi River between Baton Rouge and New Orleans. Started up in November, 1968, this plant now produces a large volume of products than the Wichita plant and ships directly from its water docks to customer around the world. Recently the plant made a single shipment valued at \$1-million. Thus, the million-dollar chemical business which moved to Wichita in 1950 now has sales in the \$200-million range and is still growing.

Bud Masterson started his career in the chemical business in 1951 as a plant operator for Tennessee Products Company located next door to, and later acquired by, Frontier Chemical. Bud worked his way up through the ranks to become one of the first-shift foremen in the plant in 1957, and now serves as the production supervisor for Chloromethanes II.

Respect for safety is also evident in the man's work record. He's never had a lost-time accident in 28 years.

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Two Years, \$8.9 Million

Vulcan Environmental Protection Project Completed

'National Model,'

Says Official of Cooperation

The way in which the environmental program was developed for the Wichita Chemicals Division of Vulcan could serve as a "model for the nation," according to the Chief Geologist for the State Department of Health and Environment.

William Bryson, Chief Environmental Geologist, said, "The cooperation and the manner in which the environmental program for a very difficult and complex industry was arrived at" has also earned praise from the Federal Environmental Protection Agency (EPA).

"EPA people have said privately—not to us, but to others—that without their stepping into it at the Federal level, this is the way they like to see state and industry work," Bryson said.

Bryson was referring to the wastewater management portion of the total environmental protection package just completed by Vulcan.

"You aren't going to have a good environmental program if you have to force compliance in big industry through regulations and fines," Bryson added. "There was a willingness (between Vulcan and the State) to create a balance between what was necessary to improve the environmental conditions and still maintain some semblance between good practices and overcontrol."

"What we feel was accomplished (at Vulcan) was a program of wastewater containment that Vulcan can be proud of. And we are proud of it, too — not only Vulcan's role, but ours in making his thing work."

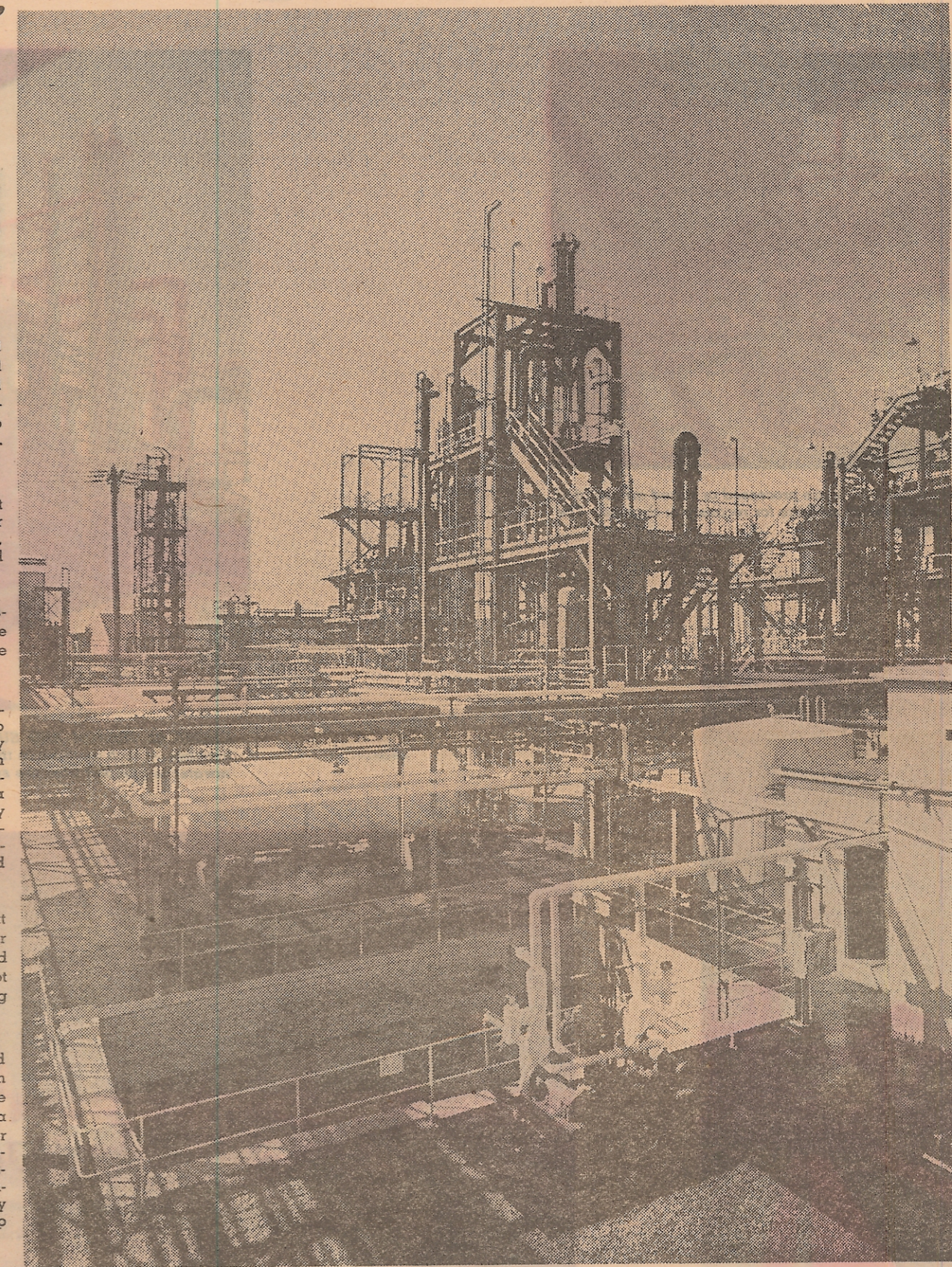
Bryson said that when the state and Vulcan first began working together in 1976, the company was asked to engage consultants and to "come up with a plan addressing their wastewater management system." He said the result has been an environmental package which brings about "a total containment of wastewater on the property by some method of lagoons, or deep wells, or retreatment."

Administrative Annex Planned For 1980 Start

An administrative annex is on the drawing boards for the Wichita Plant of Vulcan's Chemicals Division.

The planned \$1-million structure will provide space for a modern, large cafeteria, credit union offices, a medical office and employee relations department. The tentative groundbreaking date is early 1980.

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WASTEWATER HANDLING SYSTEM—All the processing facilities at Vulcan's Wichita plant have been contained to control process wastewater and any rainwater which may fall on the processing units themselves. Curbing, such as at the lower left, retains wastewater within the area. This wastewater accumulates in large sumps, as in foreground, from which it is pumped overhead to disposal facilities.

Maintenance Building Is Underway

Construction is well under way for a 26,000-square-foot maintenance building at Vulcan's Wichita complex. The \$825,000, two-story structure will consolidate and replace several older shops, as well as provide additional space for the plant engineering department.

The ground floor of the building will house a tool crib and central workshops and supervisors' offices for the pump and machinery, pipefitting, welding, electrical, instrument and general maintenance departments.

The second floor will have a maintenance scheduling office, a drafting room, conference room and 12 offices for plant engineering personnel. An overhead walkway will connect the new building to the existing administration offices.

State-approved Effort Began Two Years Ago

A multi-million-dollar waste management program has been completed at the Wichita plant complex of the Chemicals Division of Vulcan Materials Company.

Completed at a cost of \$8.9-million, the environmental protection project has been approved by the Kansas Department of Health and Environment (KDHE).

The project began slightly more than two years ago when Vulcan, one of the world's leading manufacturers of chlorinated solvents, received acceptance from KDHE of a comprehensive engineering plan for environmental enhancement.

The project has accomplished three objectives: 1) segregation of chemical process wastewater; 2) control of rainwater falling on the plant site; 3) incineration of a by-product chemical from the manufacture of dry-cleaning fluid.

Chemical process wastewater is segregated by an extensive system of curbing and paving that surrounds the chemical processing areas and diverts the waste into controlled sumps. From the sumps the wastewater is pumped to its final disposal in limestone rock over 4,000 feet beneath the surface.

Clean rainwater run-off from non-process areas is controlled by drainage through a new network of large storm sewers. These sewers terminate in two impoundment lagoons lined with densely compacted clay.

The lagoons cover 30 acres and have a volume greater than 50 million gallons — enough to hold all the rainfall falling on the plant-site during the worst storm in the last 50 years.

A high-temperature incinerator, developed for Vulcan engineers and the equipment manufacturer, destroys a worthless by-product from the cleaning fluid process. The waste is converted to harmless carbon dioxide and muriatic acid.

"Vulcan is committed to the production of its chemicals, which are basic and essential to the country's well-being, in an environmentally acceptable manner," said Jim Boyd, Manager of the Wichita Plant. "This major waste management program is in line with that continuing commitment."

New Energy Plant Nears Completion

Nearing the final stages of construction at Vulcan in Wichita is an energy conservation project to convert one of the huge plant boilers to burn hydrogen produced in the chlorine manufacturing process.

Modifications to the system include installing additional piping, a large blower, a heat exchanger and a scrubber to clean and cool the hydrogen.

When the \$500,000 project is completed, the boiler will be capable of burning 5,000 cubic feet of hydrogen per minute to provide 50,000 pounds of steam per hour to the plant.

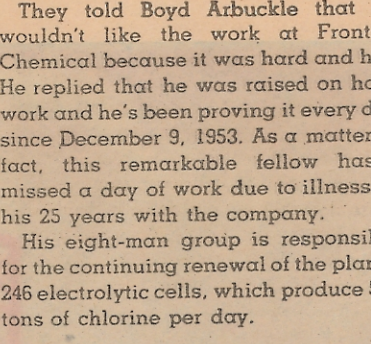
Vulcan People Provide Link to 'Frontier' Days



Boyd Arbuckle

The situation at Frontier Chemical was a bit rustic when Leon Cotton hired on back in 1951. In fact, he had to fill out his employment application on a packing crate in a construction shack after walking through ankle-deep mud to get there. Today, Leon is the No. 2 employee on the hourly seniority roster.

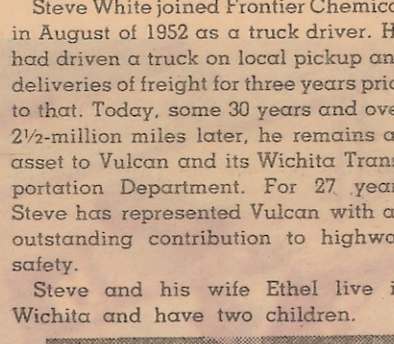
After his initial job as a muriatic hydrochloric acid plant operator, Leon went to work in almost every plant in the inorganic operations section.



Steve White

Born and raised in Texas, Vic Coats joined Frontier Chemical in Denver City as a caustic plant foreman just after receiving his chemical engineering degree from University of Texas in 1950.

Vic is considered to be Vulcan's expert on chlorine and caustic soda technology and was the chief process engineer for the design phase of the company's largest single capital expenditure to date, the \$60-million Chlor-Alkali plant at Geismar, La.



Vic Coats



John Lemon

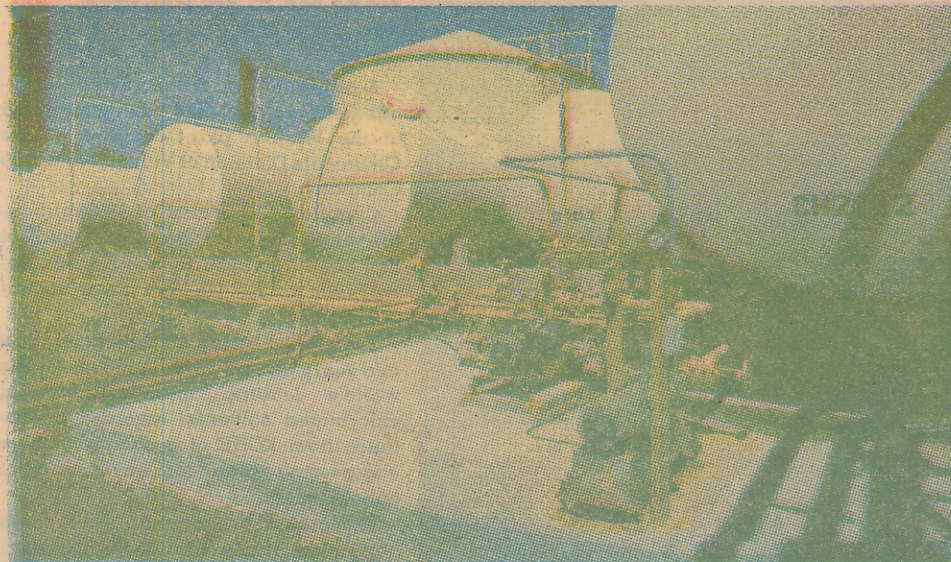
In his 21 years at the plant, John has had a hand in starting or supervising about every operation at the complex and exemplifies the many highly experienced professionals to be found there. He now supervises the process packaging dept.

Great attention is given to quality at the plant. It is the process packaging section's job to get that top quality product into a clean container and have it arrive at the customer's plant when he needs it.

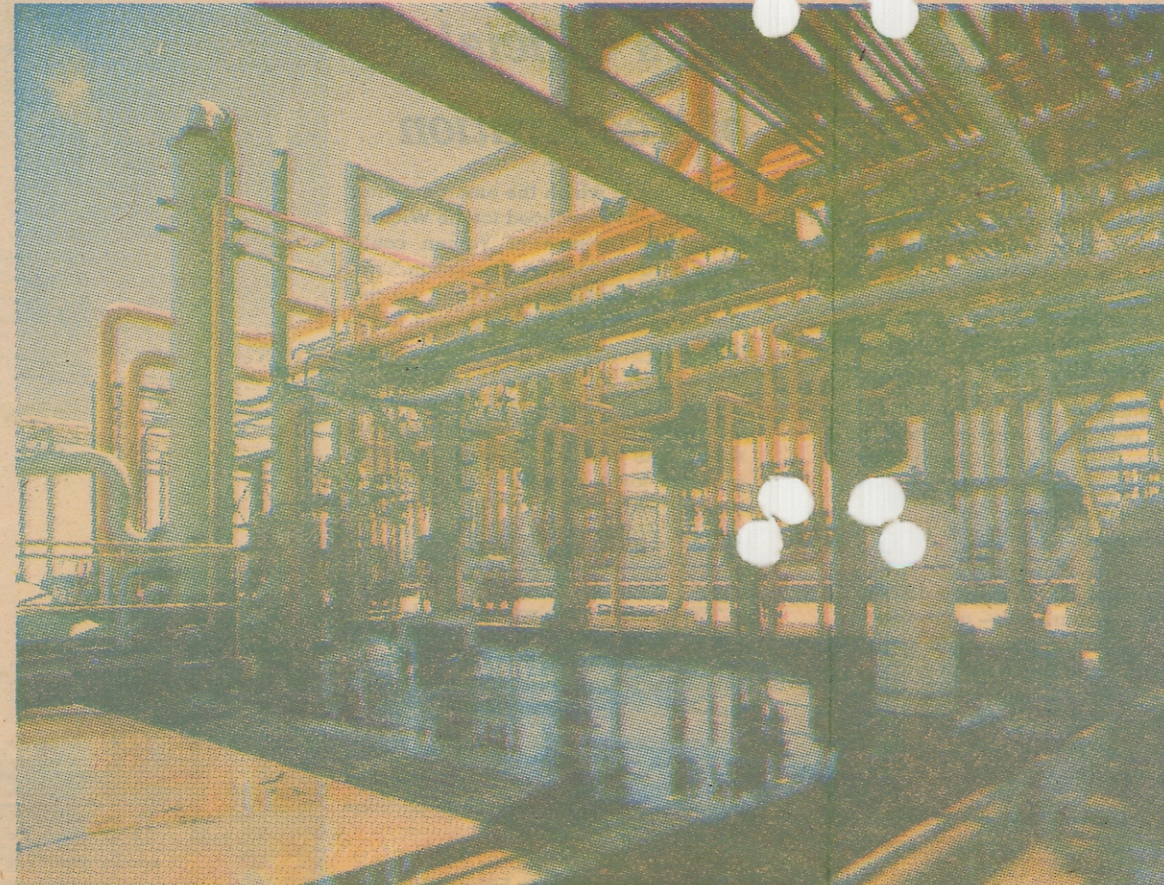


Bud Masterson

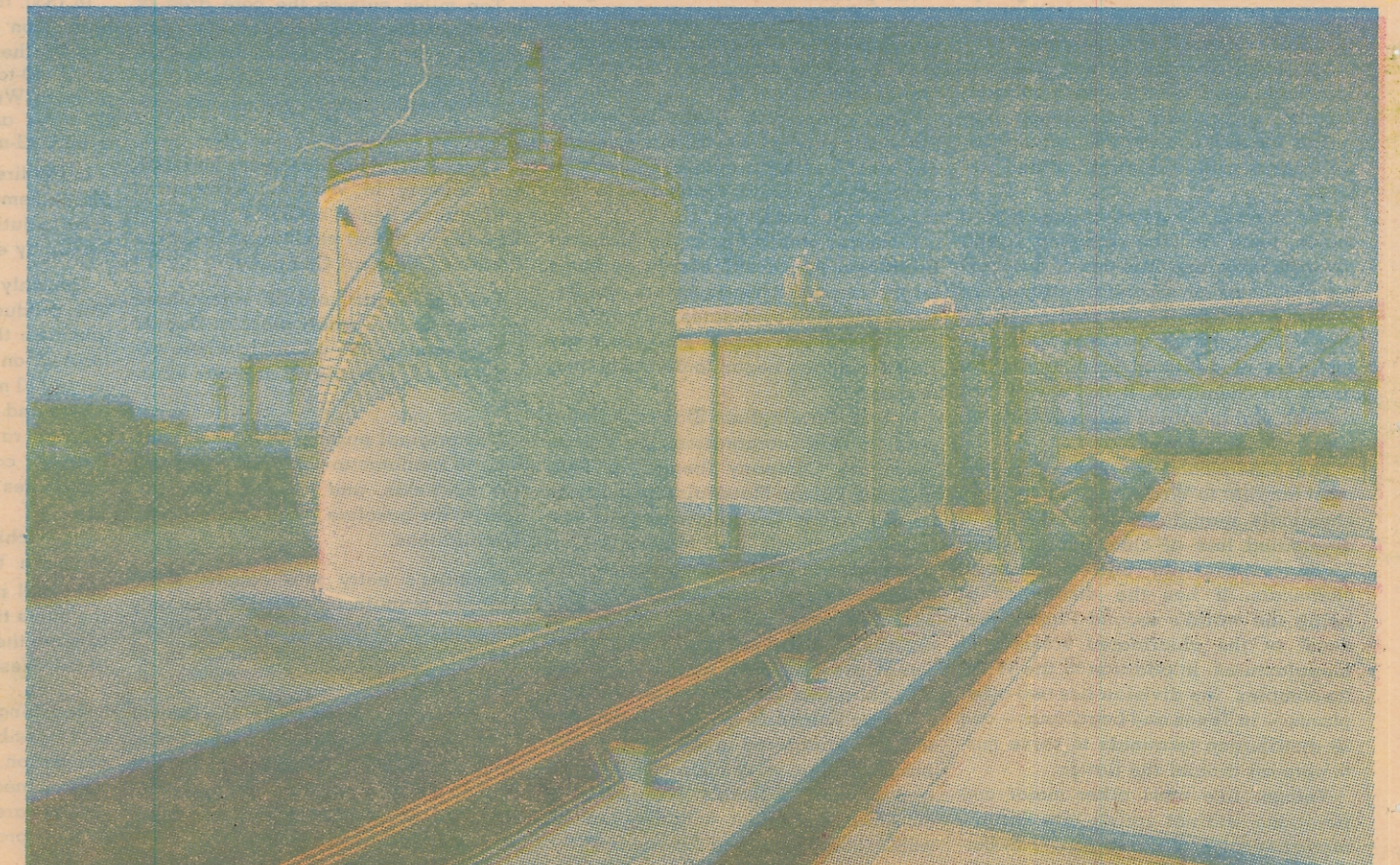
Curbing, sumps, ponds, incinerator protect environment



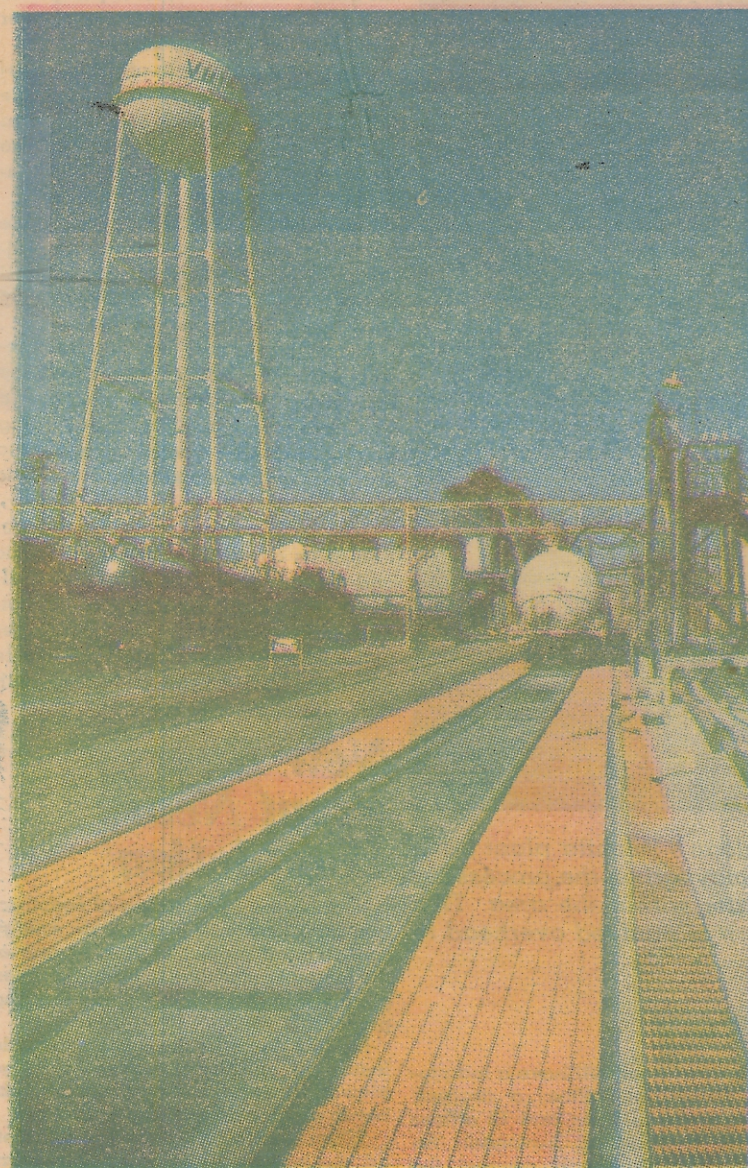
CURBING AND PAVING — Areas in which chemicals are processed or stored are isolated by a system of curbs. Paving collects any chemical spillage for recovery or disposal. The area shown here is used for product storage.



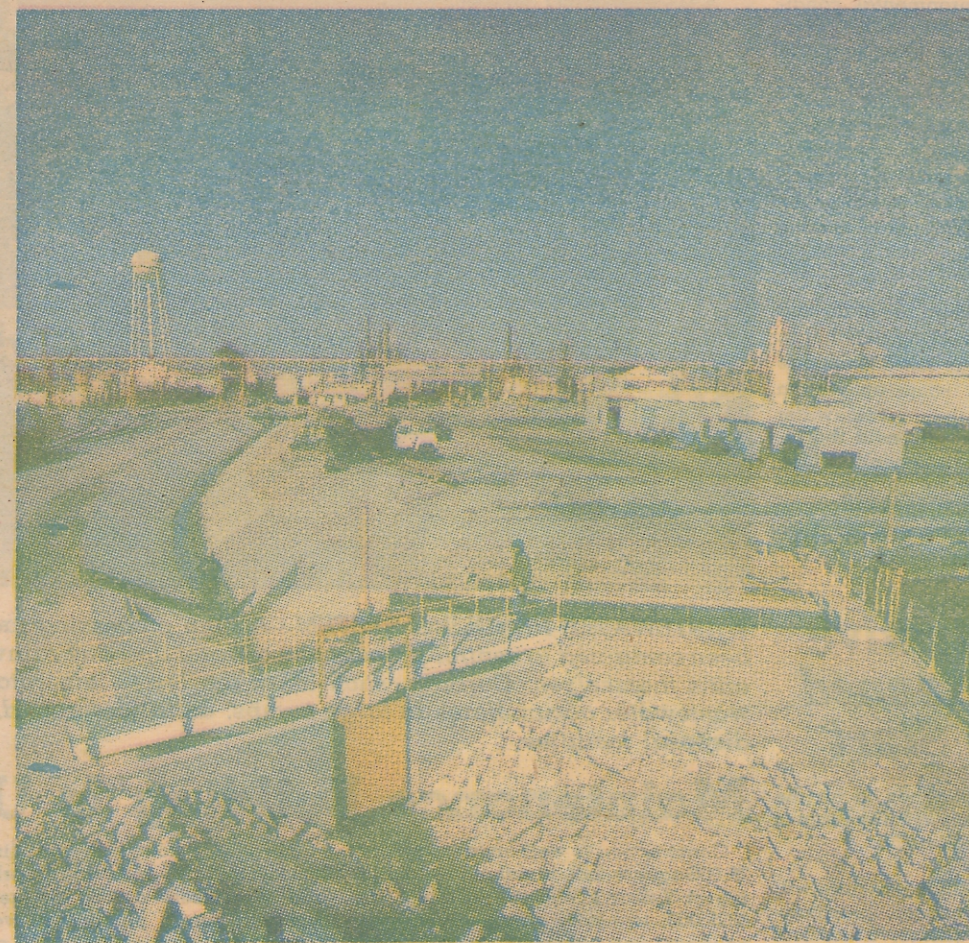
CHEMICAL TRENCH AND SUMP — Drainage within a curbed area is carried through chemically-resistant trenches — such as those in the foreground here — to process-wastewater sumps, on the left. The process-wastewater is pumped from the sump to disposal by deep-well injection 4000 feet beneath the surface.



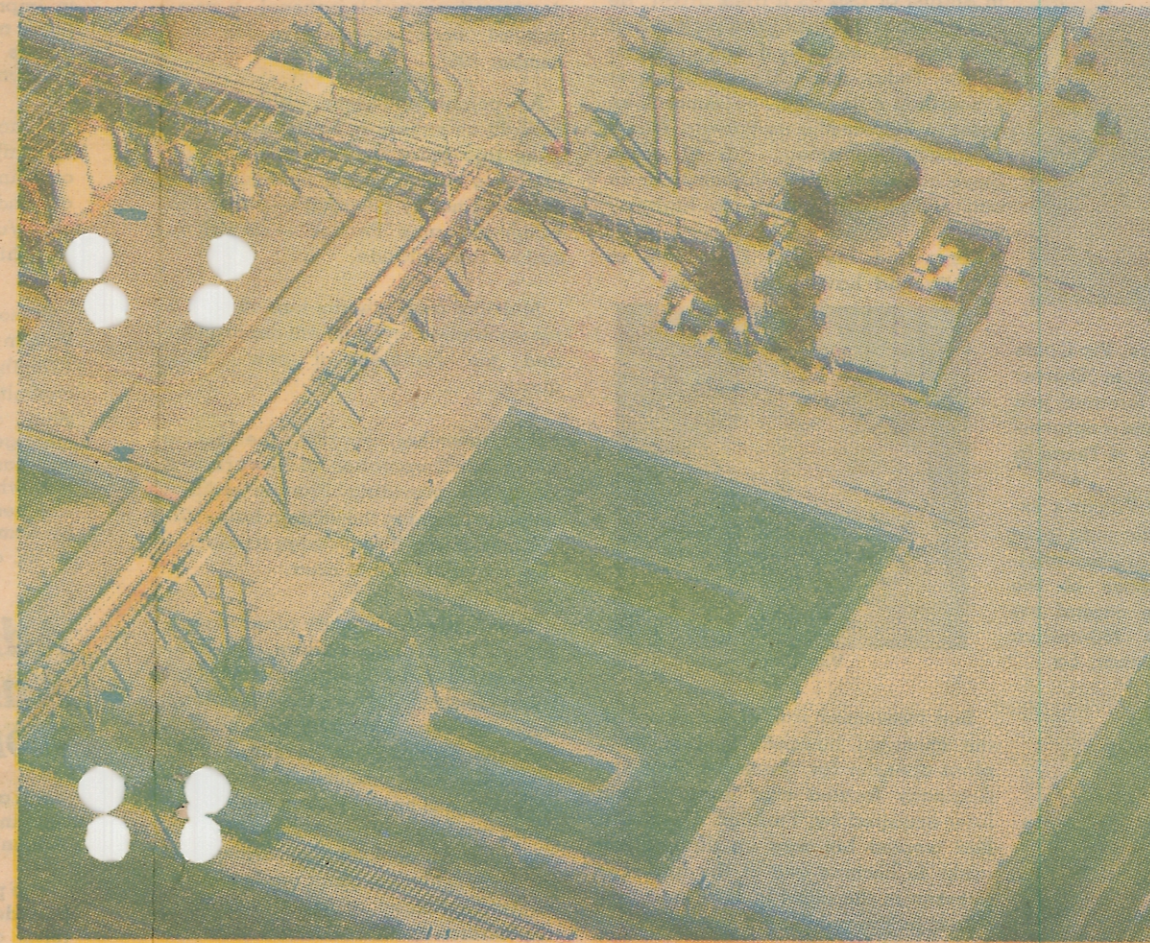
STORAGE TANKS — A 6 foot high dike surrounds these storage tanks to contain and control any unlikely spillage. To the right of the storage tanks above is a rainwater control trench which channels stormwater runoff to the plant's impoundment lagoons.



PRODUCT LOADING STATION — A series of collector pans beneath the rails catch and contain any spillage from the loading operation of railway cars.



LINED TRENCH — Trenches carry stormwater from the plant to impoundment lagoons. The gate in the foreground diverts the water into a lined pond. The purpose of the trench and pond is to collect and analyze rainwater before it is diverted to storage in impoundment lagoons. All rainwater which falls on the plant site is impounded in the lagoons; none is released to the natural waterways.



CHLOROMETHANES II LAGOONS — New plants constructed after the beginning of the environmental protection program incorporate environmental controls in their design. These lagoons are in Vulcan's new Chloromethanes Plant and are lined with chemical-resistant plastic. The lagoon in the foreground controls processed wastewater and the other is used in rainwater control.



WASTE-CHEMICAL INCINERATOR — An incinerator developed by Vulcan in cooperation with John Zink Company of Tulsa decomposes complex organic chemicals to harmless carbon dioxide and muriatic acid. The carbon dioxide is vented to the atmosphere and the muriatic acid is pumped to the plant's wastewater-handling system for disposal. The plume from the stack is air, carbon dioxide and water vapor.